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# Altona

## Specification for Quincy Street Extension for pavement

July 1922 - March 1924



Kalham Run

OLD

REPORT

Also

Specifications for  
Quincy St Extension  
to pavement -



State of Indiana,  
County of DeKalb, SS

Board of Commissioners of DeKalb County,  
Indiana, July, Term, 1922.

In Re  
Petition of Edward Kelham et al for the  
Improvement of a certain Highway in  
Keyser Township, DeKalb County, Indiana.

REPORT OF ENGINEER AND VIEWERS

Comes now, J. Frank McDowell as Engineer and Henry Hatheway and Albert Thrush Viewers, duly appointed by said Board and pursuant to the instructions of the Board of Commissioners of said County and State and show by the foregoing report, plans and specifications that we proceeded and made the necessary View and surveys of the proposed improvement upon the route substantially set out in the petition; and we hereby submit the following complete plans, profile and specifications for said proposed Improvement:-

Said proposed Improvement begins in the center of the street at the end of the Asphalt Pavement on King Street in the City of Garrett at a point on the East line of Hamsher Street as produced north. Thence West on center line of King Street to the center of Union Street extended South. Thence North on center line of Union Street to the center of Quincy Street. All of the above route being within the corporate limits of the City of Garrett. Thence West on section line on Quincy Street in the Town of Altona, the same being the Congressional Township line between Townships 33 and 34 and extending West to the West Boundary line of Keyser Township to a point where said Township line between the said Congressional Townships number thirty-three (33) and thirty-four (34) intersects with the East County line of Noble County, Indiana and there to end.

We find the length of said Improvement to be 14254 feet and stakes were set one hundred (100) feet apart and numbered consecutively. The width of said road and the kind of Improvement being fully set out in the plans and specifications.



## PREPARATION OF ROADBED

1. GRADING -- The roadway shall be graded so as to strictly conform to the plans, cross-sections and profiles attached.

The term "Grading" shall include all cuts, fills and approaches of intersecting roads within the limits of the highway, the digging and shaping of all ditches and gutters to conform to stakes and cross-sections of the road, as well as the proper forming of the gravel bed and shoulders. Soft, spongy or boggy earth in the roadbed shall be removed and the space refilled with suitable material.

The roadbed or sub-grade shall be rolled with steam roller to make it thoroughly compact and free from ruts, waves and undulations. All depressions occurring must be filled with suitable materials and again rolled, until the surface is smooth and hard. No gravel must be placed on the road when the surface of the sub-grade is wet or spongy. If a sandy or other soil be encountered, which will not compact readily under the roller, a small amount of clay or other means satisfactory to the Engineer shall be used until a firm, even surface is obtained after rolling.

In general, earth for the fills shall be taken from the cuts and in no case shall it be taken from the roadside if in so doing it becomes necessary to dig below the grade line of the ditches as shown on the plan. If the earth from the cuts is not sufficient to make the fills, suitable places where earth can be borrowed will be located by the Engineer. Deep, wide or unsightly excavations along the side of the road will not be permitted.

No trees shall be removed from the roadside except by special permission from the Engineer.

No gravel shall be placed on any portion of the road until the grading has been checked and approved by the Engineer, or by an authorized representative of the Engineer.

2. DRAINAGE -- The side ditches and gutters shall be of such size as the drainage requirements of the locality demand, and must be formed with true grades having sufficient incline to cause a free and uniform flow of water to the nearest natural outlets, which outlets must be improved where necessary so as to carry the water quickly away from the highway. The slope of the banks of the open ditches shall not be steeper than one and one-half horizontal to one vertical.

Tile drains shall be laid at such places of such kind and size, and on such grades as may be shown on the plans.



Catch basins, man holes, culverts and other drainage structures shall be built as shown on the plans and specifications and provided in the general specifications hereto attached. Concrete headwalls shall be built on all culverts and at end of tile drains.

Culverts or tile for private driveways and crossroads shall be of a suitable size to carry freely all water flowing in the ditches crossed by such driveways.

In clay soils, where the trench section is used drains shall be cut on each side through the shoulders making outlets in to the side ditches for water that may collect under the gravel. Such drains shall be eight inches or more in width and deeper than the gravel bed. They shall be placed at all low points in the grade and not farther than one hundred feet apart, in retentive soils, and must be filled with coarse gravel when the first gravel is placed. These drains must be maintained in good working order until the road is completed and thoroughly compacted.

#### GRAVEL BEDS AND SHOULDERS FOR THE TRENCH TYPE OF DESIGN.

After the road has been graded as above described the gravel bed shall be formed in the central part of the road grade as follows: Shoulders of firm earth or other suitable material shall be placed on each side of the gravel bed at such distance as may be required by the plans. The shoulders shall extend to the side ditches or gutters shown on plans for the finished road. Where the road grade is high the shoulders may be formed by moving earth from the center of the present road grade to the sides or if the grade is low, by crowing the present road grade by scraping earth from the sides toward the center or if sufficient suitable material cannot be had along the roadway it shall be brought from other places along the line of work.



## MATERIAL

The gravel shall be composed of fragments of hard, durable rock, of high resistance to abrasion, together with sand and clay or other binding material and shall be free from thin or elongated pieces.

### No. 1. For Gravel Course:-

(a) The gravel when tested by means of laboratory screens shall meet the following requirements:

Passing a 2 inch screen not less than ..... 95  
Total retained on  $\frac{1}{2}$  inch screen..... 35 to 60

(b) The material retained on the  $\frac{1}{2}$  inch screen is known as coarse aggregate. The coarse aggregate when tested by means of a laboratory screen shall meet the following requirements:

Total retained on 1 inch screen ..... 25 to 75 per cent

(c) The material passing the  $\frac{1}{2}$  inch screen is known as fine aggregate. The fine aggregate when tested by means of a laboratory sieve shall meet the following requirements:-

Total passing 200 mesh sieve ..... 15 to 35

## CONSTRUCTION

The gravel shall be spread by hand from dumping boards or by dump wagons of a type that will distribute the gravel evenly over that part of the subgrade to be covered by the load or by wagons that will distribute it uniformly over the subgrade. After the gravel has been spread as above specified it shall be harrowed with a tooth harrow until the different size particles and the cementing materials are evenly distributed through the mass.

## SPECIAL ITEMS

(a) The sub-grade shall be constructed three (3) inches higher in the center than at the sides. The gravel bed shall be nine (9) inches at the sides and eleven (11) inches at the center making five (5) inch crown in width of fourteen (14) feet of the gravel roadway.

(b) Side ditches shall be one (1) foot wide on the bottom and not less than one and one-half ( $1\frac{1}{2}$ ) feet below subgrade at any point. The inside slope to be three (3) feet to one (1) foot and the outside to be not less than one (1) foot to one (1) foot or at an angle of repose to road limits.



## SPECIAL ITEMS

(c) The ends of all cross culverts to be protected with concrete headwalls as shown on plans. Said walls to be nine (9) inches at the top and twelve (12) inches at the bottom, except as otherwise shown on the drawings.

(d) Catch basins to be constructed shall be cylindrical in form twenty (20) inches in diameter and at least six (6) inches below tile tapped. The walls shall be six (6) inches thick. They shall have an iron cover which shall meet the approval of the Engineer if not in all respects definitely shown on plans.

(e) Surplus excavation not needed in widening fills shall be disposed of by the contractor as the Engineer may direct. The Engineer at his discretion may change the grade at certain cuts where same may be done to prevent all possible waste of material.

(f) If necessary to construct retaining concrete walls at residences the work shall be done by force account plus 20% contractor's profit under plans and specifications submitted by the Engineer.

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In the placing of gravel on said sub-grade plank shall be used and set equidistant and parallel to the center of the roadway. Said planks to have an inside measurement equal to the gravel wearing surface where they are used and the said planks shall be held firmly in place by the use of strong iron pins. The gravel for the wearing surface shall be placed between said boards. The fill of gravel shall be equal to the gravel wearing surface at the point on any of the said road where the same is used all of which has heretofore been set out in the report. In all cases said gravel fill or wearing surface to be eleven (11) inches deep at the center and nine (9) inches deep at the edge.

### COMPLETED AND ACCEPTED SECTIONS:-

When any portion of the highway is to be accepted the gravel must <sup>have</sup> been rolled or dragged down as provided above and all work and material shall be completed in first class condition in all respects including grade and sub-grade, culverts, retaining walls, side ditches, and catch basins provided that said work shall be accepted in not less than one-half mile sections. The final acceptance of said work to be made by the Board of

Commissioners and Engineer when the entire work is completed. The Engineer's estimate to be made while the work is in progress shall be as provided for by law governing such cases.



## COMPLETED AND ACCEPTED SECTIONS

All grades and sub-grades shall be accepted in not less than one thousand (1000) feet sections at a time and all culverts, drains and catch basins must be completed before said grade is accepted. It is understood that when the time comes for accepting the road the contractor shall have all the side ditches in good condition and shall have scraped and leveled up the entire road and shall have in all respects complied with the specifications.

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### Rolling

After the wearing surface has been made to conform to the cross section of the road the gravel shall be dragged or rolled until solid and compact by means of a roller weighing not less than one (1) ton, and any depressions in the finished surface shall be filled by the Contractor. The rolling shall begin at the outer edge of the gravel with half the roller on the gravel and half on the earth grade, and shall continue to the crown of the wearing surface. The Engineer shall determine as to rolling or dragging the gravel wearing surface.

The Engineer may substitute harrowing, grading and dragging in place of the rolling and dragging of the wearing surface as above described and in this event the harrowing, grading and dragging shall be done not less than ten times and with tools satisfactory to the Engineer and according to his instructions.

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### TILE UNDERDRAINS

Description -- Tile underdrains shall consist of sections of land tile of the diameter shown on the plans, laid on a firm bed true to line and grade in accordance with these specifications.

#### MATERIALS.

Land Tile -- The tile shall be of first quality hard-burnt clay land tile sound and thoroughly burned, without warps, cracks or other imperfections.

#### CONSTRUCTION METHODS:

The trench shall be excavated carefully in accordance with the dimensions and cross-sections shown on the plans. All tile shall be laid true to the lines and grades given. Each section of tile shall have a full firm bearing throughout its entire length.

After the tile has been laid and approved, filling material shall be



placed carefully, so as not to displace the tile. The trench shall be filled with suitable earth.

#### SHOULDER DRAINS

Description -- Shoulder drains shall consist of trenches, cut through the shoulders and sub-grade, of the sizes and material and constructed as herein specified.

#### MATERIALS.

The materials shall consist of coarse gravel.

#### CONSTRUCTION METHODS.

Shoulder drains shall be constructed where shown on the plans. They shall be excavated before placing the first course of any type of construction and shall be at least ten (10) inches wide and the bottom of the trench at the edge of the surfacing shall be not less than four (4) inches below the sub-grade and the trench shall extend out through the shoulders so that the bottom shall follow the grade of the finished surface of the shoulder. They shall be filled with the coarse gravel and covered over with dirt.

#### CULVERT SPECIFICATIONS

All culverts shall be corrugated culverts full-circle, lap-joint, with all seams tightly riveted. They shall be galvanized with at least a two ounce coating of spelter per square foot, by spot test, and the material composing the culverts shall be at least 99.84% pure iron, taking into consideration all foreign substances. The metal composing the culverts shall be at least #16 gauge ( U. S. Standard) for all sizes under 24"; shall be at least #14 gauge ( U. S. Standard) for all sizes from #24 to 36" inclusive. On larger sizes the Engineer shall specify the gauge for each installation. The ends of the culverts shall be re-inforced in a manner satisfactory to the Engineer by concrete headwalls as per plans.

#### FILE DRAINS

If for any cause the Engineer sees fit to cut down the number of lineal feet of tile specified, the contractor shall allow credit on the contract for such tile not installed at the estimate to be made by the Engineer. Also, contractor shall be paid for extra lineal feet of tile installed as estimated by the Engineer.



## GENERAL CLAUSES

1. INTENTION-- It is intended that the work shall be constructed according to the accompanying plans and specifications. The specifications and drawings are intended to provide for and describe the complete work. They are to be co-operative and what is called for by either is as binding as if called for by both.

### 2. DEFINITION-

(a) Board - Whenever the word "Board" is used in these specifications, it refers to the Board of County Commissioners of DeKalb County, Indiana, the representatives in this contract, of the County of DeKalb, Indiana.

(b) Contractor - Whenever the word "Contractor" is used in these specifications, it shall be and is mutually understood to refer to the party or parties contracting to perform the work to be done under these specifications and contract, or the legal representatives of such parties.

(c) Engineer - Whenever the word "Engineer" is used herein, it shall be and is mutually understood to refer to the County Surveyor and to his properly authorized deputies, limited by the particular duties entrusted to them.

(d) Superintendent - Whenever the word "Superintendent" is used herein, it shall be and is mutually understood to refer to the Superintendent appointed by the Board of Commissioners to Superintend the work.

3- MEANING OF SPECIFICATIONS - In case the specifications or drawings are deficient in any part or not clearly expressed, bidders desiring to submit propositions shall apply to the Engineer for information before submitting their propositions. Bidders must examine for themselves the locations of the proposed work and exercise their own judgment as to the nature and the amount of work to be done. This work includes all excavations, embankments, grading, ditching, paving and the construction of all culverts and bridges and their improvement as herein specified. If it be found that anything has been omitted or mis-stated which is necessary for the proper performance of and the completion of any part of the work contemplated, in accordance with the spirit of the plans and specifications the Contractor will be required to execute and perform the same as if thoughtfully and correctly stated, and the correction of any error or omission shall not be deemed to be an addition to or deviation from the work herein contracted for.



4- INSPECTION - The Board may appoint such inspectors as it may deem necessary, who shall be paid by the County of DeKalb, and who shall be on the work at all times and report to the Engineer.

5- DETOUR SIGNS - When it is necessary to exclude traffic from any portion or the whole of the road under construction the Contractor shall place and maintain proper barricades upon which he shall attach "Road Closed" and "Detour" signs. The barricades and signs are to be so placed as to indicate the nearest route around the obstructed portion at the nearest cross road beyond each end of such obstructed portion so that travel can pass around in the shortest and easiest way. Where barricades are required at night the Contractor shall cause red lanterns to be placed and maintained.

6- DEFECTS BEFORE ACCEPTANCE - All depressions, defects and imperfections in any portion of the pavement, whether due to public travel or other causes before final acceptance by the Board and Engineer shall be repaired and made good by the Contractor at his own expense.

7- INTERSECTING HIGHWAYS - Contractor will include excavation or fill approaches on public roads which intersect the proposed improvements. In cuts ditches shall be constructed connecting with road ditches included in this contract. Where intersecting roads have to be graded as above specified new grade is to be covered with gravel not less than six (6) inches deep for a width of twelve feet by 20 feet in length.

8- PRIVATE CROSSINGS - The Contractor is not required to place any tile culverts or approaches to any private road. The owner served by such private road shall pay for the tile, of size designated by the Engineer. The Contractor will place same free of charge at the depth of the open ditch and backfill the trench to the proper height.

9- Said Contractor agrees that the Engineer shall decide as to the meaning and intent of any portion of the plans and specifications where the same may be found obscure or in dispute and said Engineer shall have a right to make any changes, correct any errors, or omission therein when said change or correction be necessary to the proper fulfillment of the intention of said plans and specifications.

10- CONTRACTOR'S RESPONSIBILITIES- Until the final acceptance of the work by the Engineer, it shall be under the Contractor's charge and care and he shall take every necessary and proper precaution against accident or injury to the improvement or any part thereof, by the action of the elements or from any cause whatsoever, whether arising from the execution or non-execution of the work. The Contractor shall rebuild,



repair, restore and make good, at his own expense, all injuries or damages to any portion of the work occasioned by accidental cause, or by the action of the elements, or from any causes whatsoever, before the final acceptance of the work by the Engineer. The Contractor shall hold the County harmless from any claims for injuries or from any damages to persons or property occasioned by any neglect, default, want of proper care, or misconduct on the part of the Contractor or any one in his employ, during the continuance of the work.

11- SUB-CONTRACTOR - The sub-contractor shall not, under any circumstances, relieve the Contractor of his liability or obligation under this contract. The Contractor shall not assign or transfer the contract or sublet the work or any part thereof except with the approval of the Board.

12- DAMAGE AND LOSSES - All losses or damages arising out of the nature of the work under these specifications or from any unforeseen obstructions or difficulties which may be encountered in the prosecution of the same, or from the action of the elements or from any encumbrance on the line of the work, shall be sustained by the Contractor.

13- CHARACTER OF WORKMEN AND EQUIPMENT -- The Contractor shall employ only competent and skillful men to do the work. If, in the opinion of the Engineer, any foreman or workman is incompetent or unfit to do the work, or neglects or refuses to comply with the directions of the Engineer, he shall be discharged at the Engineer's request and shall not again be employed on this improvement. The Contractor shall furnish suitable and adequate equipment for securing satisfactory quality of work and rate of progress.

14- The contractor shall furnish the Engineer any labor which he may demand for carrying out his work in the field.

15- QUALITY OF MATERIAL AND WORK - The judgment and decision of the Engineer as to whether or not the materials supplied and the labor performed under the contract, of which these specifications are a part, comply with the requirements of the contract shall be final. Before materials are placed in the work samples of the same shall have been examined or tested and shall have been approved by the Engineer. All material which has been rejected shall be promptly removed from the work and replaced with material that satisfies the requirements of the specifications. All improper and defective work shall be corrected and, if necessary, the material shall be removed and the work reconstructed in a proper manner.

16- COMMENCEMENT - The Contractor shall take the road in the condition in which he finds it at the time for the commencement of the work. The time and place of commencement shall be dictated by the Board. The work shall be prosecuted at as many different places, at such sections along the improvements, and with such forces as in the judgment of the Board, may be necessary to complete the work within the time specified.



17- **CLEARING** - Where telegraph or telephone poles or pipe lines are within the right-of-way and interfere with the proper construction of the road, they shall be removed by the company or corporation to whom they belong after ten (10) days notification having been given to the owners, and if not removed in that length of time, the Contractor shall remove same and the cost of such work shall be taxed against the owners. There shall be removed all trees, brush, stumps, fences, stones (except cornerstones) which shall be carefully preserved and protected from disturbance or injury until an authorized agent has witnessed or otherwise referenced the location), or other encumbrance within the limits of the right-of-way or so contiguous thereto as in any way to interfere with construction.

18- Any trees not interfering with the proper construction of the road may be left standing at the request of the owner, subject to the discretion of the Engineer, whose decision shall be final. All valuable material, etc removed by the Contractor and not required elsewhere in the construction of the road shall belong to the County, providing the Engineer demands it.

19- **PROVISION FOR PUBLIC TRAFFIC** - The Contractor shall make suitable means and adequate provisions for the safe and free traffic and passage of vehicles and persons, by, over, or under the work which is in progress. Such provisions shall be made to the satisfaction of the Board.

20- **SUSPENSION OF WORK**- For such periods as is necessary or during such time as the weather is unsuitable for doing work, the Engineer may suspend the work at places or altogether. In case of such suspension during the working season, the time within which the Contractor is required to complete the work shall be extended by as many days as the same was suspended, plus an additional ten (10) days. Upon any stoppage of the work, all material shall be safely placed so as not to obstruct or impede travel on the right of way, and so that it will not be damaged in any manner.

21- **FINAL CLEARING UP** - Before the final acceptance of the work, the Contractor shall remove from the right of way all unused material and rubbish and shall leave the right of way in a neat and presentable condition and shall restore all property, public or private, which he has injured during the continuance of the work.

22- If the Contractor has not commenced or carried forward or is improperly performing, or has abandoned, or fails, or refuses to complete the work, the Board of Commissioners may re-let the work, or may complete the same by force account, and in either case the Board of Commissioners may deduct the cost and expense thereof from any moneys that may be due the Contractor and if there is not sufficient moneys due the Contractor to pay for said work, the Board of Commissioners will require the Contractor or his bondsmen to pay for it.



1- **ENGINEER'S STAKES** - Stakes will be set by the Engineer for the center line, side of slopes, finished grade and other necessary points properly marked for the cut or fill. When the grade line is approached the final grade stakes will be set for which two (2) days notice must be given to the Engineer.

2- **CUTS** - In cuts the material shall be removed to such a depth that the remaining material when rolled with a ten (10) ton roller will conform to the true sub-grade. All excess material shall be placed in embankments or used in extending the shoulders as directed by the Engineer. All this excess material shall be brought to a smooth and even surface before the final acceptance of the work.

3- **FILLS** - Embankment shall be made of earth or other approved materials and shall be built up full width from the bottom in successive uniform layers not exceeding twelve (12) inches in thickness. Each of these layers shall be rolled until thoroughly compacted. When the use of a ten (10) ton roller to roll the entire embankment is impracticable a lighter one, or heavy rammers, may be used if special permission to do so is granted by the Engineer; but that part of the embankment over which the pavement is to be laid must be rolled with a ten (10) ton roller. The roller shall pass over the entire area of each layer of the fill at least twice. The sides of the embankment shall be kept lower than the center during all stages of the work and the surface maintained in condition for adequate drainage. The use of muck, quick-sand, soft clay or spongy material which will not consolidate under the roller is prohibited. All side slopes shall be broken by horizontal furrows two (2) feet apart before any material is placed thereon. All areas on which embankments less than one (1) foot in depth are to be placed, shall be broken up by plowing or other means. When the earth work is completed the cross-section of the road-bed shall conform to the cross-sectional drawings and profile attached hereto and sub-grade shall be constructed and rolled full width before gravel is deposited. All slopes shall be properly dressed to lines given by the Engineer.

4- **BORROW PITS** - Borrow pits within the limits of the right of way shall be excavated to neat lines and shall be carried to only such depth as will permit of adequate drainage by the ditch system provided.

5- **PORTLAND CEMENT** - All cement used in this work shall be Portland Cement which shall conform to the specifications of the American Society of Testing Materials.

6- **CONCRETE** - All concrete to be mixed in the proportions by volume of one part Portland Cement, two parts sand and three parts gravel. One sack cement will be considered equivalent to one cubic foot.



## ONE-COURSE REINFORCED CONCRETE PAVEMENT

**SUB-GRADE: Rolling and Tamping.** When the grading has been completed as herein specified, the entire surface of the sub-grade shall be rolled until thoroughly compacted with a steam roller, weighing not less than five (5) tons nor more than ten (10) tons. All soft places developed in rolling shall be dug out and replaced with clean gravel or crushed stone, and thoroughly compacted by tamping or rolling. All places inaccessible to the roller shall be tamped with a fifty (50) pound hammer, the face of which shall not exceed one hundred (100) square inches in area. No foundation material shall be placed upon the sub-grade while it is cut up in ruts and ridges, which may have been produced by hauling over the same or otherwise. All ruts and ridges must be smoothed off and tamped to the proper grade before any material is dumped upon the same.

**CROWN** of the pavement at the center shall be not less than one one-hundredth ( $1/100$ ) of its width, and the finished surface shall conform to the arc of a circle.

**FORMS** to be of either steel or wood. If wood, not less than two (2) inch stock, capped with two (2) inch angle iron, shall be used. They shall be free from warp and of sufficient strength to resist springing out of shape. They shall be well staked and braced and held to the proper line, and the upper edge shall conform to the surface of the finished pavement and have a width equal to the required thickness of the pavement. All forms shall be oiled before the concrete is deposited against them, and all mortar and dirt shall be removed from forms that have been previously used.

**CEMENT** used in the construction of this improve ment shall be Portland cement, conforming to the requirements of the United States Bureau Standard Circular No. 33.

**FINE AGGREGATE** shall consist of sand of clean, hard durable grains, free from organic matter; when dry it shall pass a laboratory screen having circular openings one-quarter ( $1/4$ ) of an inch in diameter, not more than fifty (50) per cent. by weight shall pass a No. 30 laboratory sieve and not more than ten (10) per cent. by weight shall pass a No. 100 sieve, and not more than five (5) per cent. by weight shall be removed by the elutriation test.

**COARSE AGGREGATE** shall consist of washed gravel or crushed stone.

a. Washed gravel shall be clean, hard, tough and durable, free from vegetable or other deleterious matter and shall not contain soft, flat or elongated particles, or clay or coatings of any character. The size shall be such that one hundred (100) per cent shall pass a screen having circular openings of not more than two and a half ( $2\frac{1}{2}$ ) inches in diameter and not more than five (5) per cent shall pass a No. 8 Tyler screen having eight (8) square meshes per lineal inch, and no intermediate sizes above those particles that will pass a one-half ( $1/2$ ) inch round opening shall be removed. When tested by the Rea Modified Delaval abrasion test the loss shall not be more than twelve (12) per cent.

b. Crushed stone shall have a French coefficient of not



loss than eight (8); hardness of not less than ten (10); and toughness of not less than seven (7);. The size shall be such that one hundred (100) per cent shall pass a screen having circular openings of not more than two and a half (2½) inches and not more than five (5) per cent shall pass a screen having circular openings one quarter (¼) inch in diameter.

PREFORMED expansion strips shall consist of a bituminous material mixed with wood pulp, limestone dust, sand or other organic matter to give it stability. The bituminous material of which these strips are made shall be such that it will not melt in hot weather nor become brittle in cold weather.

EXPANSION JOINTS shall be inserted in advance of the concreting. A one-half (½) inch preformed longitudinal expansion joint shall be placed between the curb and the pavement and shall extend through the entire depth of the pavement. Transverse expansion joints three-eighths (3/8) of an inch in thickness and of sufficient width to extend from the bottom of the base to one-half (½) inch above the finished surface shall be placed one hundred (100) feet apart. <sup>or closer if required</sup> All joints shall be set ahead of the placing of the concrete by securely staking a clean plank two (2) inches thick and eight (8) inches wide and a length of not less than the width of the pavement and at right angles to the center line thereof. The plank shall be accurately set and held in place vertically to a true line. The preformed expansion strip shall then be placed in the proper position and concrete placed at both sides of the joint, to hold the preformed expansion joint filler in true alignment. After the concrete has been placed, the plank shall be withdrawn slowly, tamping the concrete under it, as fast as it is lifted, leaving the expansion joint filler in place and one-half (½) inch above the finished surface of the pavement. Joints at all street, alley and driveway intersections shall also be protected as transverse joints. Expansion joint filler shall also be placed around the manholes, catch basins and valve boxes. The contractor shall take extra care at all transverse expansion joints; all coarse stone next to the expansion strip is to be replaced with a rich mortar of sand and cement. The surface of the pavement shall be absolutely level on each side of the joints. Before the surface has set, the edges of the concrete on each side of the joint shall be rounded off with an edger.

SEALING TRANSVERSE JOINTS. Before the street is opened to traffic the expansion strips shall be cut off one-quarter (¼) inch above finished surface, the remaining portion of the strip shall be melted into the joints with hot asphalt irons and sealed by pouring hot tar of an approved quality and consistency into and over the joints when dry. Any other cracks that appear shall be treated with hot tar in the same manner. Care shall be observed to prevent the tar from spreading over the surface of the pavement for a width of more than one (1) inch on either side of the joint. This work shall be done after the entire pavement has been completed.

BATCH MIXER of an approved type shall be used for preparing the concrete. The mixer shall be placed as near the point of deposit as possible, and the concrete placed direct from the mixer into the pavement. In case the mixer breaks down the concrete shall be thoroughly mixed by hand on water-tight platforms to complete only the section.

WATER used for this work shall be clean, free from oil, acid, alkali or vegetable matter.



**DEVICES FOR MEASURING MATERIALS.** The accurate measurement of each of the materials composing and the production of a uniform mixture of the finished concrete are essential. The contractor shall furnish and use approved timing devices, a water measuring and discharging device, also boxes or pans of such dimensions as will give, when filled and struck, the exact volumes of aggregate required by the engineer. The mixer shall be equipped with a batch meter of an approved type.

**PROPORTIONS.** The concrete shall be mixed in the proportions of one (1) sack of Portland cement to not more than two (2) cubic feet of fine aggregate and not more than three (3) cubic feet of coarse aggregate, and in no case shall the volume of the fine aggregate be less than one-half ( $\frac{1}{2}$ ) of the volume of the coarse aggregate.

A cubic yard of concrete in place shall contain not less than one and six-tenths (1.6) barrels of cement.

**WATER.** The concrete shall be sprinkled with as much water as will be absorbed readily.

**REINFORCING MATERIALS.** The pavement shall be reinforced with either steel bars or mesh fabric, having a net effective weight of not less than forty (40) pounds per hundred square feet, for pavement the width of which does not exceed twenty-four (24) feet. For pavement of greater width than twenty-four (24) feet, the steel bars or mesh shall have a net effective weight of not less than fifty (50) pounds per hundred square feet.

a. **Steel Bars.** Steel bars shall conform to the requirements of the Standard Specifications of the A. S. T. M., 1918, for "Billet-Steel Concrete Bars."

b. **Mesh Reinforcement.** Mesh reinforcement shall be manufactured from steel which shall develop an ultimate tensile strength of not less than seventy thousand (70,000) pounds per square inch, and shall bend one hundred and eighty (180) degrees around one (1) diameter without cracking on the outside of the bent portion. The material shall be furnished on the work in flat sheets, of a length equal to four (4) inches less than the width of the pavement, unless otherwise permitted, so constructed that they shall retain their original shape during the necessary handling. These sheets shall be free from excess rust, scale, paint or coating of any character which will tend to destroy their bond with the concrete.

**FINISHING CONCRETE MECHANICALLY.** After the concrete has been deposited, it shall be leveled off, tamped and finished, mechanically with a machine approved by the engineer, until all voids are removed, the concrete is thoroughly compacted, and the surface finished to the elevation and cross-section shown on the plans. The machine shall go over each area of the pavement a sufficient number of times and at such intervals as will give the desired results. The final tamping and finishing shall be given at such time as the engineer may direct and not until the surface is free from water.

**BEAT FINISH:** After this process has been completed the pavement shall be finished by two applications of a belt made of canvas or rubber belting, not less than six (6) inches wide and not less than two (2) feet longer than the width of the pavement. The belt shall be applied with a combined crosswise and longitudinal motion. For the first application vigorous strokes at least twelve (12) inches long shall be used and the longitudinal movement of the belt along the pavement shall be very slight. The second application of the belt shall be immediately after the water glaze or wash has been removed and the strokes of the belt shall be not more than four (4) inches and the longitudinal movement shall be much greater than the first belting.



**CURING AND PROTECTION.** Except as hereinafter specified, the surface of the pavement shall be sprayed with water as soon as it can be done without damaging the concrete, the surface of the pavement shall be covered with not less than two (2) inches of earth or other material approved by the engineer, which cover shall be kept wet for at least ten days. When deemed necessary or advisable by the engineer, freshly laid concrete shall be protected by canvas until such covering can be placed.

Under the most favorable conditions for hardening in hot weather the pavement shall be closed to traffic for at least twenty-one (21) days, and in cool weather for an additional time, to be determined by the engineer.

The contractor shall erect and maintain suitable barriers to protect the concrete from traffic and any part of the pavement damaged from traffic or other causes, occurring prior to its official acceptance, shall be repaired or replaced by the contractor at his expense, in a manner satisfactory to the engineer. Before the pavement is thrown open to traffic the covering shall be removed and disposed of as directed by the engineer.

**COLD WEATHER WORK.** Concrete shall not be mixed nor deposited when the temperature is below freezing.

If, at any time during the progress of the work, the temperature is or in the opinion of the engineer, will, within twenty-four (24) hours, drop to thirty-five (35) degrees Fahrenheit, the water and aggregates shall be heated and precautions taken to protect the work from freezing for at least ten (10) days. In no case, shall concrete be deposited upon a frozen sub-grade.



## CEMENT CURB.

The cement curb shall be six (6) inches wide at the top, eighteen (18) inches deep with batir as shown on detail plans.

The lower twelve (12) inches and the backing for the upper six (6) inches shall be composed of one (1) part of Portland cement, two (2) parts clean, sharp sand and four (4) parts clean, broken stone.

The sand shall be carefully screened and free from lean or other foreign material. The stone used shall be crushed limestone or boulders varying in size from one-fourth ( $\frac{1}{4}$ ) inch up to one (1) inch in the largest dimensions, and entirely free from dust or dirt. Cleaned screened gravel may be used in place of the crushed stone if acceptable to the engineer.

The cement and sand shall first be thoroughly mixed dry and must be mixed until it shows a uniform color throughout, then sufficient water added and the mixing continued until a mortar of the proper consistency is obtained. The stone will then be added and the mixing continued until every fragment of stone is completely coated with the mortar, the concrete will then be put in place in layers not over six (6) inches in thickness and thoroughly tamped until the free mortar appears on top.

The upper six (6) inches shall be faced as shown on drawings with a facing one (1) inch thick composed of one (1) part Portland cement and two (2) parts sharp, clean sand.

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The sand and cement shall mixed dry and then sufficient water added until a paste of the proper consistency for use is formed.

The forms must be made of straight plank securely held in place so that the finished curb will show a true grade and alignment. A board one (1) inch thick shall be placed in the form for the facing space and after the backing has been thoroughly tamped, this shall be removed and the facing mixture put in place, and thoroughly tamped. The top and face shall be trowelled smooth and then brushed with a fine brush.

The curb while still plastic, shall be saw-cut at intervals of eight (8) feet to provide for expansion and contraction.



PAVEMENT OF FT. WAYNE AND BOWLING GREEN RAILWAY COMPANY

The pavement between the rails and (18) inches on the outside of rails to be made with crushed rock. The Ballast to be installed shall be put in place by said Railway Company who shall furnish all labor and material and perform the work according to plans and specifications at the expense of said company.



State of Indiana,  
County of DeKalb, SS

Board of Commissioners of  
DeKalb County,  
November Term 1922.

In Re

Petition of Edward Kelham et al for  
the improvement of a certain Highway in  
Wayner Township, DeKalb County, Indiana.)

Amended and Modified Report of Engineer and Viewers is hereby as  
follows:-

From 0 to 11 plus 84 - concrete pavement 30' wide with curve as per 1st report.....	\$ 9497.34
From 11 plus 84 to 42- concrete 16 ft. wide with 4ft. berm as modified.....	\$13600.00
Tile to be installed as per 1st report.....	\$ 560.00
From 42 to 90 plus 86- as per plans and specifications 1st report.....	\$ 4212.00
From 90 plus 86 to 142 plus 50 - as per plans and specifications 1st report.....	\$ 5018.00
Grading from 42 to 142 plus 50 - " " " " " "	\$ 1100.00
Culverts complete - " " " " " "	\$ 560.60
Total Estimate as per Modified Report.....	\$34567.94
Incidentals.....	\$ 1000.00

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
Viewer

\_\_\_\_\_  
Viewer



S. W. Johnston (L. S.)



March - 17 - 1924

## Altona - Indiana - Paving Extension -

Specifications for the widening of the sixteen (16) foot concrete pavement now contracted for by C. D. Huffman on Quincy Street in the town of Altona, Indiana from the East Corporation line at the intersection of the center line of said Quincy Street with the West line of Union Street in Garrett Indiana and from thence West on said Quincy Street for a distance of approximately 3000 feet

Said street to be made two (2) feet wider on each side of the sixteen (16) foot concrete pavement as contracted for by the said C. D. Huffman et al in his Contract for the Kelham et al Road in Keyser Township, DeKalb County, Indiana as shown on the plans, cross section showing the extension of two (2) feet on each side and the profile for said work which are a part of the specifications

~~Said extension of two (2) feet on each~~



2.

Said extensions to be two (2) feet in width on each side and not less than six (6) inches thick at the outer edge and to be reinforced with a steel wire netting and to be built at the same time and of the same kind of material and under the same supervision General & Detail specifications that the main portion of said concrete pavement is built of.

The said General & Detail specifications which are now on file in the County Auditors office of DeKalb County Indiana for the construction of the Kelham et al Road in the said Keyser Township (which is now under contract) are made a part of the specifications for said extension to said concrete pavement as if fully copied here in - viz:- That when said concrete pavement is completed and accepted it will be twenty (20) feet in width with the necessary approaches to all the streets with the berm and gutter as



Shown on the plans and cross section for  
said pavement on Quincy Street in  
Albion, Indiana

Further:- All Manholes, Catch Basins  
inlets or outlets or drains along that  
portion of the street being improved shall  
be adjusted by the Contractor to the grade  
of the street and repaired as the Engineer or  
Superintendent in charge of the work directs  
for which the Contractor will not receive  
any additional pay for said labor.

If necessary to rebuild said Catch  
Basins or Manholes if ordered to do so by  
the Engineer; Then the Contractor to receive  
such extra pay for labor and material as  
agreed upon by the Engineer as set forth  
in the specifications for the general contract  
for extra work -

All Monuments and Corners along said  
street shall be protected by the Contractor  
until the Engineer has made record of the  
same -



London J. De Harcourt  
Chicago Ill.

Dear Sir



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